

## CLAIMS

I claim:

1. A fingerprint verification system, comprising:

a smart card reader including

5 a fingerprint sensor, and

a first microprocessor generating by minutia extraction a measured template having a plurality of measured data chunks from data read by said fingerprint sensor, each measured data chunk representing a fingerprint minutia;

10 a smart card including

a static memory storing a reference template having a plurality of reference data chunks,

a second microprocessor executing a matching algorithm for determining whether said measured template matches said reference template, and

15 a random access memory (RAM) storing a subset of said reference data chunks and a subset of said measured data chunks during execution of said matching algorithm; and

a communication channel between said smart card and said smart card reader.

20 2. The system of Claim 1, wherein said subset of said reference data chunks constitutes a substantially reduced version of said reference template.

3. The system of Claim 1, wherein said subset of said measured data chunks constitutes a substantially reduced version of said measured template.

25 4. The system of Claim 1, wherein a measured data chunk is loaded into said RAM of said smart card through said communication channel.

5. The system of Claim 1, wherein each of said measured data chunks and each of said reference data chunks comprise:

- a location of a minutia;
- a minutia angle of said minutia; and
- 5 a neighborhood of said minutia.

6. The system of Claim 5, wherein said location comprises: a first coordinate; and a second coordinate.

7. The system of Claim 6, wherein said first coordinate is quantized.

8. The system of Claim 7, wherein said first coordinate is quantized to  
10 equal to or less than eight bits.

9. The system of Claim 6, wherein said second coordinate is quantized.

10. The system of Claim 9, wherein said second coordinate is quantized to equal to or less than eight bits.

15 11. The system of Claim 5, wherein said minutia angle is quantized.

12. The system of Claim 11, wherein said minutia angle is quantized to equal to or less than eight bits.

13. The system of Claim 5, wherein said neighborhood comprises positional parameters of a plurality of a predetermined number of neighbors.

14. The system of Claim 13, wherein said positional parameters comprises:

a distance between said minutia and a neighbor minutia;

5 a first angle between a first coordinate in a direction tangential to a ridge where said minutia is extracted and a line drawn between said minutia and said neighbor minutia; and

a second angle between said first coordinate and a second coordinate in a direction tangential to a ridge where said neighbor minutia is extracted.

15. The system of Claim 14, wherein said distance is quantized.

10 16. The system of Claim 15, wherein said distance is quantized to equal to or less than eight bits.

17. The system of Claim 14, wherein said first angle is quantized.

18. The system of Claim 17, wherein said first angle is quantized to equal to or less than eight bits.

15 19. The system of Claim 14, wherein said second angle is quantized.

20. The system of Claim 19, wherein said second angle is quantized to equal to or less than eight bits.

21. The system of Claim 13, wherein said neighbors are sorted.

22. The system of Claim 1, wherein said second microprocessor is an  
20 8-bit microprocessor.

23. The system of Claim 1, wherein said second microprocessor has a speed between approximately 1 megahertz and approximately 10 megahertz.

24. The system of Claim 1, wherein said RAM is approximately 256 kilobyte in size.

5 25. The system of Claim 1, wherein said reference data chunks are sorted.

26. The system of Claim 1, wherein said measured data chunks are sorted.

10 27. The system of Claim 1, wherein said RAM stores only one reference data chunk and only one measured data chunk during execution of said matching algorithm.